

CLAIM AMENDMENTS

(1) (currently amended): A composite structure comprised of a metal matrix having diamond particles dispersed therein, wherein said diamond particles are characterized by the presence of a layer of beta-SiC chemically bonded to the surface thereof, said composite structure having a thermal conductivity greater than about 300W/m.k., and wherein the metal matrix material is essentially either aluminum or magnesium.

(2) (canceled)

(3) (original): The structure of claim 1 wherein the metal matrix material is essentially aluminum.

(4) (currently amended): The structure of claim 1 wherein the metal matrix material is essentially ~~copper~~ magnesium.

(5 – 16) (canceled)

(17) (original): The structure of claim 1 wherein the carbon of the SiC is derived from the respective diamond particles to which it is bonded.

(18) (original): The structure of claim 1 wherein the diamond particles are in the size range of 100 - 120 microns.

(19 – 40) (canceled)

41) (previously presented): The composite described in claim 74, wherein the temperature to which the preform is heated is at least 1300 degrees centigrade.

42) (previously presented): The composite described in claim 74, wherein the temperature to which the preform is heated is at least 1400 degrees centigrade.

43) (previously presented): The composite described in claim 74, wherein the temperature to which the preform is heated is at least 1500 degrees centigrade.

44) (previously presented): The composite described in claim 74, wherein the temperature to which the preform is heated is at least 1600 degrees centigrade.

45) (previously presented): The composite described in claim 74, wherein the temperature to which the preform is heated is at least 1700 degrees centigrade.

46 – 50) (canceled)

51) (currently amended): A metal matrix composite comprising a matrix containing diamond powder, said diamond powder having a thin SiC surface layer on the respective diamond particles comprising said powder, said SiC layers being comprised of a conversion coating formed by a chemical vapor reaction of SiO with the respective diamond particles, and said metal matrix composite having a thermal conductivity greater than about 300W/m.k., and wherein the metal employed is essentially either aluminum or magnesium.

52) (original): The composite described in claim 51, having a thermal conductivity greater than about 400W/m.k.

53) (original): The composite described in claim 51, having a thermal conductivity greater than about 500W/m.k.

54) (original): The composite described in claim 51, having a thermal conductivity greater than about 600W/m.k.

55) (original): The composite of claim 51, wherein the metal employed is aluminum.

56) (original): The composite of claim 52, wherein the metal employed is aluminum.

57) (original): The composite of claim 53, wherein the metal employed is aluminum.

58) (original): The composite of claim 54, wherein the metal employed is aluminum.

59) (original): The composite of claim 51, wherein the metal employed is magnesium.

60) (original): The composite of claim 52, wherein the metal employed is magnesium.

61) (original): The composite of claim 53, wherein the metal employed is magnesium.

62) (original): The composite of claim 54, wherein the metal employed is magnesium.

63-66) (canceled)

67) (previously presented): The composite described in claim 51, wherein the content of the SiC coated diamond powder in the composite is about 10-60 vol% of the total.

68) (previously presented): The composite described in claim 51, wherein the content of the SiC coated diamond powder in the composite is greater than about 70 vol% of the total.

69) (previously presented): The composite described in claim 51, wherein the content of the SiC coated diamond powder in the composite is greater than 80 vol% of the total.

(70) (previously presented): The composite described in claim 51, wherein the particle size of the diamond powder used is preferably about 50-150 microns.

(71) (original): The composite described in claim 51, wherein the particle size of the diamond powder used is preferably greater than 150 microns.

(72) (original): The composite described in claim 51, wherein the particle size of the diamond powder is greater than about 200 microns.

(73) (original): The composite described in claim 51, wherein the particle size of the diamond powder is greater than about 300 microns.

(74) (currently amended): A metal matrix composite containing diamond powder, said diamond powder comprising diamond particles having a thin SiC surface conversion coating formed thereon, such coating being formed by heating a preform of Si powder and diamond powder plus a binder, the purpose of said binder being to hold the Si in contact with the surface of the respective diamond particles, heating said preform to a temperature sufficient to cause the surface conversion reaction to occur, and said metal matrix composite having a thermal conductivity greater than about 300W/m.k., and wherein the metal comprising the matrix is essentially either aluminum or magnesium.

(75) (original): The composite described in claim 74, having a thermal conductivity greater than about 400W/m.k.

(76) (original): The composite described in claim 74, having a thermal conductivity greater than about 500W/m.k.

(77) (original): The composite described in claim 74, having a thermal conductivity greater than about 600W/m.k.

(78) (original): The composite described in claim 74, wherein metal comprising the matrix is aluminum

(79) (original): The composite described in claim 75, wherein the metal comprising the matrix is aluminum.

(80) (original): The composite described in claim 76, wherein the metal comprising the matrix is aluminum.

(81) (original): The composite described in claim 77, wherein the metal comprising the matrix is aluminum.

(82) (original): The composite described in claim 74, wherein the metal comprising the matrix is magnesium.

(83) (original): The composite described in claim 75, wherein the metal comprising the matrix is magnesium.

(84) (original): The composite described in claim 76, wherein the metal comprising the matrix is magnesium.

(85-89) (canceled)

(90) (previously presented): The composite described in claim 74, wherein the content of the SiC coated diamond powder in the composite is about 10-60 vol% of the total.

(91) (previously presented): The composite described in claim 74, wherein the content of the SiC coated diamond powder in the composite is greater than about 70 vol% of the total.

(92) (previously presented): The composite described in claim 74, wherein the content of the SiC coated diamond powder in the composite is about greater than about 80 vol% of the total.

(93) (original): The composite described in claim 74, wherein the particle size of the diamond powder used is preferably about 50-150 microns.

(94) (original): The composite described in claim 74, wherein the particle size of the diamond powder used is greater than about 150 microns.

(95) (original): The composite described in claim 74, wherein the particle size of the diamond powder used is greater than about 200 microns.

(96) (original): The composite described in claim 74, wherein the particle size of the diamond powder used is greater than about 300 microns.

(97 – 106) (canceled)

(107) (currently amended): A high thermal conductivity substrate for LDMOS electronic packages, wherein the substrate is a metal matrix composite comprising a metal containing dispersed therein diamond particulates which have a thin SiC coating, said coating having been produced by a chemical vapor reaction process between gaseous SiO and the respective diamond particles, said metal matrix composite having a thermal conductivity greater than about 300W/m.k., and wherein the metal employed for the metal matrix is essentially either aluminum or magnesium.

(108) (original): The substrate of claim 107, wherein the metal employed for the metal matrix is aluminum.

(109) (original): The substrate of claim 107, wherein the metal employed for the metal matrix is magnesium.

(110) (canceled)

(111) (original): The substrate of claim 107, wherein the process utilized to consolidate the metal matrix composite is pressure squeeze casting.

(112) (previously presented): The substrate of claim 111, wherein the metal employed for the metal matrix is aluminum.

(113) (previously presented): The substrate of claim 111, wherein the metal employed for the metal matrix is magnesium.

(114) (canceled)

(115) (currently amended): An electronic package containing an LDMOS chip bonded to a substrate with very high thermal conductivity, wherein said substrate is a metal matrix composite containing particulate diamond, and said particulate diamond has a thin SiC surface coating formed on the respective particles thereof by a chemical vapor reaction process between gaseous SiO and said diamond powder, said metal matrix composite having a thermal conductivity greater than about 300W/m.k., and wherein the metal employed for the metal matrix is essentially either aluminum or magnesium.

(116) (original): The electronic package described in claim 115, wherein the metal employed for the metal matrix is aluminum.

(117) (currently amended): The electronic package described in claim 115, wherein the metal employed for the metal matrix is ~~copper~~ magnesium.

(118) (original): The electronic package described in claim 115, wherein the process utilized to consolidate the metal matrix composite is pressure squeeze casting.

(119) (previously presented): The electronic package described in claim 116, wherein the process utilized to consolidate the metal matrix composite is pressure squeeze casting.

(120) (previously presented): The electronic package described in claim 117, wherein the process utilized to consolidate the metal matrix composite is pressure squeeze casting.

(121) (currently amended): A high thermal conductivity substrate for LDMOS electronic packages, wherein the substrate is a metal matrix composite containing diamond particulates which have a thin SiC conversion coating, such coating being formed by heating a preform of Si powder and diamond powder plus a binder, the purpose of said binder being to hold the Si in contact with the diamond surface, and heating said preform to a temperature sufficient to cause the surface conversion reaction to occur, said metal matrix composite having a thermal conductivity greater than about 300W/m.k., and wherein the metal employed for the metal matrix is essentially either aluminum or magnesium.

(122) (original): The substrate of claim 121, wherein the metal employed for the metal matrix is aluminum.

(123) (original): The substrate of claim 121, wherein the metal employed for the metal matrix is magnesium.

(124) (canceled)

(125) (original): The substrate of claim 121, wherein the process utilized to consolidate the metal matrix composite is pressure squeeze casting.

(126) (previously presented): The substrate of claim 125, wherein the metal employed for the metal matrix is aluminum.

(127) (previously presented): The substrate of claim 125, wherein the metal employed for the metal matrix is magnesium.

(128) (canceled)

(129) (currently amended): An electronic package containing an LDMOS chip bonded to a substrate with very high thermal conductivity, wherein said substrate is a metal matrix composite containing diamond particulates which have a thin SiC conversion coating, said coating being formed by heating a preform of Si powder and diamond powder plus a binder, the purpose of said binder being to hold the Si in contact with the diamond surface, and heating said preform to a temperature sufficient to cause the surface conversion reaction to occur, said metal matrix composite having a thermal conductivity greater than about 300W/m.k., and wherein the metal employed for the metal matrix is essentially either aluminum or magnesium.

(130) (original): The electronic package described in claim 129, wherein the metal employed for the metal matrix is aluminum.

(131) (currently amended): The electronic package described in claim 129, wherein the metal employed for the metal matrix is ~~copper~~ magnesium.

(132) (original): The electronic package described in claim 129, wherein the process utilized to consolidate the metal matrix composite is pressure squeeze casting.

(133) (previously presented): The electronic package described in claim 130, wherein the process utilized to consolidate the metal matrix composite is pressure squeeze casting.

(134) (previously presented): The electronic package described in claim 131, wherein the process utilized to consolidate the metal matrix composite is pressure squeeze casting.

(135) (original): An electronic package for high power applications, requiring very high thermal dissipation, comprising a composite structure as defined in claim 1 having a high thermal conductivity further characterized by the presence of a layer of aluminum nitride deposited on the surface thereof, said aluminum nitride providing an electrically insulating layer and also providing a high thermal conductivity path allowing for electronic chips to be bonded to the electrically insulating aluminum nitride layer, and also allowing electronic circuitry to be formed or deposited on the aluminum nitride.

(136 – 139) (canceled)

(140) (previously presented): The structure of claim 1, having a thermal conductivity greater than about 400W/m.k.

(141) (previously presented): The structure of claim 1, having a thermal conductivity greater than about 500W/m.k.

(142) (previously presented): The structure of claim 1, having a thermal conductivity greater than about 600W/m.k.

(143) (previously presented): The substrate of claim 107, wherein said metal matrix composite has a thermal conductivity greater than about 400W/m.k.

(144) (previously presented): The substrate of claim 107, wherein said metal matrix composite has a thermal conductivity greater than about 500W/m.k.

(145) (previously presented): The substrate of claim 107, wherein said metal matrix composite has a thermal conductivity greater than about 600W/m.k.

(146) (previously presented): The electronic package described in claim 115, wherein said metal matrix composite has a thermal conductivity greater than about 400W/m.k.

(147) (previously presented): The electronic package described in claim 115, wherein said metal matrix composite has a thermal conductivity greater than about 500W/m.k.

(148) (previously presented): The electronic package described in claim 115, wherein said metal matrix composite has a thermal conductivity greater than about 600W/m.k.

(149) (previously presented): The substrate of claim 121, wherein said metal matrix composite has a thermal conductivity greater than about 400W/m.k.

(150) (previously presented): The substrate of claim 121, wherein said metal matrix composite has a thermal conductivity greater than about 500W/m.k.

(151) (previously presented): The substrate of claim 121, wherein said metal matrix composite has a thermal conductivity greater than about 600W/m.k.

(152) (previously presented): The electronic package described in claim 129, wherein said metal matrix composite has a thermal conductivity greater than about 400W/m.k.

(153) (previously presented): The electronic package described in claim 129, wherein said metal matrix composite has a thermal conductivity greater than about 500W/m.k.

(154) (previously presented): The electronic package described in claim 129, wherein said metal matrix composite has a thermal conductivity greater than about 600W/m.k.